

# SUBJECT INDEX

## A

- Acaulospora* spp.  
legumes and, 141
- Acetate  
See Acetogenic bacteria
- Acetic acid  
microbial silver recovery and, 326
- Acetic acid bacteria  
coexistence with yeasts, 2
- Acetanaerobium noterae*, 418
- Acetobacterium carbinolicum*  
hydrogenase of, 436
- Acetobacterium wieringae*, 418
- Acetobacterium woodii*, 418, 422  
acetyl-coenzyme A and, 440  
carbon flow in, 429  
carbon monoxide dehydrogenase of, 432  
hydrogenase of, 435-36  
phenol degradation and, 441-42  
tetrahydrofolate enzymes of, 430
- Acetogenic bacteria, 415-43  
acetyl-coenzyme A and, 438-41  
carbon monoxide dehydrogenase of, 432-35  
corrinoid proteins of, 431-32  
ecology of, 441-42  
formate dehydrogenase of, 426-30  
hydrogenase of, 435-37  
methanol and, 437-38  
methyltransferase of, 431-32  
properties of, 418-24  
tetrahydrofolate enzymes of, 430-31
- Acetogenium kiwui*, 418
- Acetone  
cactus-specific yeasts and, 25
- 2-Acetylaminofluorene  
carcinogenicity of, 385
- Acetylcholine receptors  
rabies virus and, 162-63
- Acetyl-coenzyme A  
acetogenic bacteria and, 438-41
- N*-Acetylgalactosamine  
*Plasmodium falciparum* and, 459
- N*-Acetylglucosamine  
cactus-specific yeasts and, 25  
*Plasmodium falciparum* and, 462
- Acholeplasma laidlawii* B  
sodium ion-stimulated ATPase of, 268
- Achromobacter* spp.  
natural transformation in, 212, 229
- Acidaminococcus fermentans*  
glutaconyl CoA decarboxylase of, 269
- Acid phosphatase  
*Entamoeba histolytica* and, 241
- Acinetobacter calcoaceticus*, 356  
competence in, 215-16
- Acinetobacter* spp.  
genetic transfer in, 226  
natural transformation in, 212, 229  
nucleoside degradation in, 228
- Acquired immune deficiency syndrome  
HTLV-III/LAV and, 173-75
- Adenine nucleotide translocator  
oxidative phosphorylation and, 278-79
- Adenosine diphosphate  
adenine nucleotide translocator and, 278-79
- Adenosine diphosphate sulfurylase  
*Thiobacillus ferrooxidans* and, 314
- Adenosine triphosphate  
adenine nucleotide translocator and, 278-79  
malaria parasites and, 464
- Adenylate cyclase  
*Bordetella pertussis*, 664  
cholera toxin and, 578
- Adenylate cyclase toxin  
effects of, 677
- Adenylate kinase  
*Thiobacillus ferrooxidans* and, 314
- Adhesins  
*Bordetella pertussis*, 675
- ADP  
See Adenosine diphosphate
- Aedes* spp.  
Japanese encephalitis virus and, 399, 406
- Aeromonas hydrophila*  
antigenic structure of, 490  
enterobactin and, 496  
enterotoxin of, 588  
fish disease and, 480-81  
pathogenesis of, 493-95
- Aeromonas salmonicida*  
antibodies to, 486-87  
antigenic structure of, 489-90  
cell-mediated immunity and, 485  
clinical manifestations of, 482  
fish disease and, 480  
iron uptake and, 496  
macrophages and, 484  
pathogenesis of, 492-97  
phagocytosis and, 496  
proteases of, 497
- Agammaglobulinemia  
viral infection and, 160
- Agglutinogens  
*Bordetella pertussis*, 664-67
- Agrobacterium tumefaciens*, 354  
plant-cell attachment genes in, 145
- Agromyces ramosus*  
catalase and, 120
- Alkalophilic bacteria  
cytosolic pH homeostasis in, 266
- Alpha<sub>1</sub> acid glycoprotein  
*Plasmodium falciparum* and, 463
- Aluminum  
ferrous iron oxidation and, 315
- Amblyomma americanum*, 293, 299
- Amblyomma cajennense*, 293
- Amblyomma* spp.  
distribution of, 294
- Amblyomma striatum*, 293
- Amebiasis  
hydrocortisone and, 249  
prevalence of, 238  
See also *Entamoeba histolytica*
- Amines  
gastrointestinal microflora and, 374
- Amino acids  
carcinogenicity of, 382
- Amino acid sequencing  
*Bacillus thuringiensis* and, 559-61
- 2-Aminoanthracene  
bacterial activation of, 381
- 2-Aminofluorene  
bacterial activation of, 381
- Aminoglycosides  
gastrointestinal microflora and, 374
- 1-Aminopyrene  
carcinogenicity of, 380-81

- Ammonia  
intestinal, 374
- Amoebapore, 253-54
- Ampicillin  
androgen metabolism and, 384  
oral contraceptives and, 384  
urinary estriol and, 383
- Ampicillin resistance  
*Escherichia coli* and, 586
- AMT-BIOCLAIM, 329
- Anabaena* spp.  
*nif* genes of, 526, 538-42
- Anaerobic bacteria  
gastrointestinal, 368
- Anaphylatoxins  
inflammatory response and, 33
- Androgens  
metabolism of, 384
- Anopheles* mosquito  
malaria parasites and, 452
- Anthranel synthase  
complexes in fungi, 71-72  
prokaryotic, 58  
tryptophan biosynthesis and, 56
- Antibiotic resistance  
*Bacillus* spp. and, 214  
enterotoxigenic *Escherichia coli* and, 585  
plasmid DNA and, 279-81  
*Rhizobium* populations and, 133  
streptococcal, 635-55  
See also specific type
- Antibiotics  
colon cancer and, 388-89  
gastrointestinal microflora and, 375-77  
oral contraceptives and, 384
- Antibodies  
fish disease and, 486-88  
humoral  
*Entamoeba histolytica* and, 251-52  
merozoite invasion of erythrocytes and, 452  
monoclonal  
*Plasmodium falciparum* and, 461  
*Plasmodium knowlesi* surface protein and, 468-69  
rhoptry components and, 469  
*Plasmodium falciparum* and, 461
- Antigens  
Duffy  
*Plasmodium knowlesi* and, 457-58  
*Plasmodium vivax* and, 458-59  
*Escherichia coli*, 186  
immune complex detection and, 31  
*Mycobacterium leprae*, 43  
merozoite, 464-70  
*Pseudomonas aeruginosa* cystic fibrosis and, 34-35  
*Plasmodium falciparum*, 466-67
- Antinuclear factors  
lepromatous leprosy and, 43
- Antithymocyte serum  
Theiler's virus and, 165
- $\alpha$ -1-Antitrypsin deficiency, 39
- APS reductase  
*Thiobacillus ferrooxidans* and, 314
- Aquaspirillum fasciculus*, 112
- Aquaspirillum magnetotacticum*, 108-9, 112  
catalase and, 120  
iron deficiency and, 120  
nitrogenase complex and, 119
- Aquaspirillum peregrinum*, 112
- Arachidonate  
pertussis toxin and, 669
- Arachnids  
Japanese encephalitis virus and, 404
- Archaeobacteria, 340-41
- Arenaviruses  
central nervous system and, 167-69
- Argas japonicus*  
Japanese encephalitis virus and, 404
- Arginine pathway  
*Saccharomyces cerevisiae* metabolic elasticity of, 73-74
- Aromatization  
gastrointestinal microflora and, 375
- Arsenic  
ferrous iron oxidation and, 315
- Arsenical pump  
plasmid-mediated arsenic resistance and, 280-81
- Arsenic resistance  
arsenical pump and, 280-81
- Arthralgia  
cystic fibrosis and, 36
- Arthritis  
cystic fibrosis and, 36  
reactive  
immune complex tissue damage and, 46
- Ascomycetes  
tryptophan gene-enzyme relationships in, 60-63
- Ascorbic acid  
microaerophiles and, 113
- Asialofetuin  
*Entamoeba histolytica* contact killing and, 254
- Aspartate  
*Escherichia coli* enterotoxins and, 584
- Aspergillus fonsecae*  
endolyase of, 9
- Aspergillus nidulans*  
anthranilate synthase complexes in, 71-72  
tryptophan gene-enzyme relationships in, 57-59  
tryptophan genes of cloning of, 63
- Astaxanthin  
yeasts and, 19
- Astrocytes  
division of  
injuries triggering, 161
- ATP  
See Adenosine triphosphate
- ATPase  
*Escherichia coli* potassium transport and, 271-74  
sodium ion-stimulated, 267-68  
sodium/potassium ion, 271-74
- Atractyloside  
mitochondrial translocator and, 279
- Autoantibodies  
lepromatous leprosy and, 43  
viral infection and, 178
- Azide  
*Thiobacillus ferrooxidans* and, 315
- Azo dyes  
carcinogenicity of, 380
- Azomethane  
carcinogenicity of, 378
- Azoreductase  
carcinogenicity of, 377-80  
diet and, 376-77  
gastrointestinal microflora and, 372-73
- Azospirillum brasilense*  
aerobic growth of, 120
- Azospirillum* spp., 111  
*nif* genes of, 526  
respiratory protection and, 119
- Azotobacter chroococcum*  
respiratory protection and, 119
- Azotobacter* spp.  
competence induction in, 229  
*nif* genes of, 526  
*nifHDK* transcripts of, 542

- nucleoside hydrolases in, 228  
*Azotobacter vinelandii*  
 cytochromes of, 119  
 poly- $\beta$ -hydroxybutyrate and, 215  
 natural transformation in, 213  
 Azoxymethane  
 carcinogenicity of, 378
- B**
- Bacillus anthracis*, 549  
*Bacillus cereus*, 549  
*Bacillus thuringiensis* cloning and, 554  
*Bacillus thuringiensis* protoplasts and, 552  
*Bacillus circulans*  
*Phaffia rhodozyma* and, 19  
*Saccharomyces cerevisiae* and, 14  
*Bacillus* spp.  
 antibiotic resistance of, 214  
 competence in, 213  
 iron reduction and, 327  
 mercury resistance in, 626  
 nucleoside phosphorylases of, 227  
*Bacillus subtilis*  
*Bacillus thuringiensis* cloning and, 554  
 conjugative transposons and, 652  
 crystal protein gene of, 566-67  
 DNA binding in, 216-23  
 DNA processing in, 227  
 DNA-processing mutations of, 215  
 DNase resistance in, 227  
 extracellular DNA of, 225-26  
 poly- $\beta$ -hydroxybutyrate and, 215  
 natural transformation in, 212-13  
 plasmid transformation in, 221-22  
 sporulation in, 564-66  
*Bacillus thuringiensis*, 549-72  
 crystal proteins of, 550-51, 555-59  
 dipteran larvae and, 568-70  
 lepidopteran larvae and, 551-68  
 subsp. *darmsadiensis*  
 toxins of, 570  
 subsp. *israelensis*  
 toxins of, 568-69  
 subsp. *kyushuensis*  
 toxins of, 568-69  
 Bacteremia  
 infective endocarditis and, 40
- Bacteria**  
 enterotoxins of, 577-95  
 fish disease and, 480-81  
 natural transformation in, 211-30  
 ribosomal RNAs in, 339  
 See also specific type  
 Bacterial enzymes  
 carcinogenicity of, 377-81  
 Bacterial ion transport, 263-82  
 arsenical pump, 279-81  
 chloride, 275-76  
 phosphorylated compounds, 276-79  
 potassium, 271-75  
 sodium, 264-71  
 Bacteriocin  
*Rhizobium* spp. and, 141-42  
*Streptococcus faecalis*  
 hemolysin protein and, 651  
 Bacteriophages  
*Rhizobium* spp. and, 140  
 Bacteriorhodopsin  
 chloride ion transport and, 275-76  
 Bacteriuria  
 asymptomatic  
*Escherichia coli* and, 203-4  
*Bacteroides fragilis*  
 mutagen activation and, 381  
 newborns and, 369  
 transferable resistance determinants in, 655  
*Bacteroides* spp.  
 diphenylamine and, 374  
 fecal mutagens and, 387  
 gastrointestinal, 368  
 diet and, 370  
 $\beta$ -glucuronidase and, 371  
*Bacteroides thetaiotamicron*  
 mutagen activation and, 381  
*Bacteroides vulgatus*  
 mutagen activation and, 381  
 Basidiomycetes  
 tryptophan gene-enzyme relationships in, 60-63  
 Basophils  
 Fc receptors on, 512  
 pertussis toxin and, 669  
 Bats  
 Japanese encephalitis virus and, 402-3  
 B cells  
 immunoglobulins and, 503-4  
*Bdellovibrio* spp.  
*Rhizobium* spp. and, 140  
 Bedbugs  
 Japanese encephalitis virus and, 404  
*Beggiatoa hermsii*  
 catalase and, 120
- Beggiatoa* spp., 109  
 aerotactic behavior of, 116  
 catalase and, 120  
 sulfide and, 124-25  
 Bepridyl  
*Entamoeba histolytica* contact killing and, 254  
*Bifidobacterium* spp.  
 diphenylamine and, 374  
 gastrointestinal, 368  
 diet and, 370  
 Bile acids  
 fecal  
 high-fat diet and, 376  
 gastrointestinal microflora and, 374-75  
 Biotin  
 bacterial sodium ion transport and, 269  
 Birds  
 Japanese encephalitis virus and, 401  
 Birnaviruses  
 fish disease and, 481  
 Blood-brain barrier  
 viral infection and, 161-63  
 B-lymphocytes  
 immunoglobulin receptors on, 504  
 Bongkreik acid  
 mitochondrial translocator and, 279  
 Border disease, 166  
*Bordetella bronchiseptica*, 673, 677  
*Bordetella parapertussis*, 680  
*Bordetella pertussis*, 661-81  
 animal models and, 672-75  
 attachment of, 675-76  
 host defenses and, 676-78  
 phase variation in, 670-71  
 systemic disease and, 679-81  
 virulence factors of, 662-70  
*Borrelia* spp., 110-11  
*Bradyrhizobium japonicum*  
 drought and, 139  
 genetic exchange among, 134-35  
 host-specificity genes in, 145  
 inoculant  
*Glycine* max nodules and, 132  
 rhizosphere and, 144  
 root attachment of, 145  
 soil type and, 136  
*Bradyrhizobium* spp., 111-12  
 drought and, 139  
 pH and, 138  
 Breast-feeding  
 infant gastrointestinal colonization and, 369

- Bronchial lavage  
  cystic fibrosis and, 39  
Bronchopneumonia  
  pertussis and, 672, 676  
*Bullera tsugae*, 17  
Bunyaviruses  
  central nervous system and, 164  
*Butyribacterium methylotrophicum*, 423  
  carbon flow in, 429  
  methanol and, 437  
C  
Cactus necroses  
  yeasts and, 23-25  
Cadmium  
  microbial accumulation of, 328  
Cadmium resistance  
  *Staphylococcus aureus*, 280  
Calcium  
  malaria parasites and, 464  
  pertussis toxin and, 669  
Calcium ion transport  
  bacterial, 265  
Calvin-Benson cycle  
  *Thiobacillus ferrooxidans* and, 314  
Calvin cycle  
  acetogenic bacteria and, 417  
  *Sulfobacillus thermosulfidoxidans* and, 318  
*Calyptogenia magnifica*, 351-52  
*Calyptogenia* spp., 356-57  
*Campylobacter cryaerophila*, 109  
  aerotolerance of, 115  
  metronidazole and, 123  
*Campylobacter fetus*  
  aerotolerance of, 115  
*Campylobacter jejuni*, 109-10  
  aerotolerance of, 113-15  
  cytochromes of, 122  
  diarrhea and, 108-10  
  enterotoxin of, 589  
  hydrogen peroxide and, 117  
  iron deficiency and, 120  
  NADH and, 122  
  porin channels in, 121-22  
  respiratory rate for, 119  
*Campylobacter nitrofigilis*, 112  
  nitrogen complex and, 119  
*Campylobacter* spp., 109-10  
  catalase and, 120  
  cytochromes of, 122  
  metronidazole and, 122  
*Campylobacter sputorum*, 109  
  bv. *bubulus*  
    oxygen toxicity and, 118-19  
  lactate dehydrogenase of, 124  
  NADH and, 122  
  protective enzymes and, 121  
*Candida diddensii*, 10  
*Candida oregonensis*, 17  
*Candida silvicola*, 10-11  
Canine distemper virus  
  persistent infection and, 170-72  
Carbenicillin resistance  
  *Pseudomonas aeruginosa*, 85  
Carbohydrates  
  acetyl-coenzyme A and, 438  
Carbon dioxide  
  *Cyniclomyces guttulatus* and, 11-12  
  *Thiobacillus ferrooxidans* and, 314  
Carbon monoxide dehydrogenase  
  acetogenic bacteria and, 417, 425-26, 432-35  
Carbonyl cyanide *m*-chlorophenylhydrazine  
  sodium ion transport and, 270  
*Carnegiea gigantea*, 24  
Carotenoid  
  yeasts and, 19  
Catalase  
  malaria parasites and, 118  
  microaerophiles and, 114, 120-21  
Cell-mediated immunity  
  *Entamoeba histolytica* and, 252  
  fish disease and, 485  
Cell processes  
  viral infection and, 162  
Cellular immunity  
  leprosy and, 42  
Cellulose  
  bacterial degradation of, 442  
Central nervous system  
  arenaviruses and, 167-69  
  coronaviruses and, 166-67  
  paramyxoviruses and, 169-72  
  picornaviruses and, 165-66  
  retroviruses and, 172-75  
  rhabdoviruses and, 169  
  RNA viruses and, 159-79  
  togaviruses and, 166  
  viral infection and, 161-63  
Ceramideaminoethylphosphonate  
  *Entamoeba histolytica* and, 240  
Cerebellar hypoplasia  
  persistent viral infection and, 175  
Cerebral hypoplasia  
  persistent viral infection and, 175  
Cerebrospinal fluid  
  oligoclonal immunoglobulins in, 163  
Cerebrospinal fluid shunts  
  *S. epidermidis* and, 40  
Chalcocite  
  *Sulfolobus* spp. and, 318  
Chalcopyrite  
  *Sulfolobus* spp. and, 318  
Channel catfish virus  
  antigenic structure of, 489  
  fish disease and, 481-82  
Chemotaxis  
  *Rhizobium* spp. and, 143  
Chenodeoxycholic acid  
  gastrointestinal microflora and, 375  
Chicken mites  
  Japanese encephalitis virus and, 404  
Chloramphenicol  
  deesterification of, 374  
  oral contraceptives and, 384  
Chloramphenicol resistance  
  streptococcal, 646  
*Chlorella* spp.  
  tryptophan synthase in, 63  
Chloride  
  *Thiobacillus ferrooxidans* and, 315  
Chloride ion transport  
  bacterial, 275-76  
Cholera toxin, 578-83  
Cholesterol  
  *Entamoeba histolytica* virulence and, 249  
  filamentous hemagglutinin and, 667-68  
Cholesterol dehydrogenase  
  fecal  
    colon cancer and, 376  
Cholic acid  
  gastrointestinal microflora and, 375  
*Chromatium vinosum*  
  thallium uptake in, 274-75  
Chromatolysis  
  poliomyelitis virus and, 161  
Chromium  
  *Thiobacillus ferrooxidans* and, 315  
Chromosomal mutation  
  enterotoxigenic *Escherichia coli* and, 587  
Chromosome mapping  
  *Pseudomonas* genome and, 88-91  
Chromosomes  
  *Pseudomonas aeruginosa*, 85-86  
Chymotrypsin  
  *Plasmodium knowlesi* and, 457-58  
Chytridiomycetes  
  tryptophan gene-enzyme relationships in, 60-62

- Citrobacter* spp.  
*Escherichia coli* enterotoxin plasmids and, 586  
*Clostridium acetivum*, 416-18  
hydrogenase of, 435-36  
*Clostridium acetiurici*  
formate dehydrogenase of, 428  
*Clostridium difficile*  
transferable resistance determinants in, 655  
*Clostridium formicoaceticum*, 418-19  
carbon monoxide dehydrogenase of, 425  
formate dehydrogenase of, 428  
tetrahydrofolate enzymes of, 430  
*Clostridium magnum*, 418-22  
*Clostridium multifermentans*  
exolyase of, 9  
*Clostridium pasteurianum*  
formate dehydrogenase of, 426  
*Clostridium perfringens*  
mutagen activation and, 381  
*Clostridium* spp.  
diphenylamine and, 374  
gastrointestinal, 368  
mercury resistance in, 627  
*nif* genes of, 526  
*Clostridium symbiosum*  
glutacetyl CoA decarboxylase of, 269  
*Clostridium thermoaceticum*, 416-18, 423  
acetate synthesis in, 424-25  
acetyl-coenzyme A and, 438-40  
carbon monoxide dehydrogenase of, 425-26, 432-35  
corrinoid proteins of, 431-32  
formate dehydrogenase of, 426-29  
hydrogenase of, 435-37  
tetrahydrofolate enzymes of, 430  
*Clostridium thermoautoaceticum*  
tetrahydrofolate enzymes of, 430  
*Clostridium thermoautotrophicum*, 418  
formate dehydrogenase of, 428  
hydrogenase of, 435  
methanol and, 437-38  
tetrahydrofolate enzymes of, 430  
Cluster analysis  
ribosomal RNA and, 342-43  
Coal desulfurization, 324-25  
Cobalt  
corrinoid proteins and, 431-32  
ferrous iron oxidation and, 315  
Coenzyme Q  
*Thiobacillus ferrooxidans* and, 314  
Colicin  
*Escherichia coli* virulence and, 204  
Coliform bacteria, 368  
Collagenase  
*Entamoeba histolytica*, 245  
Colon cancer  
bacterial metabolism and, 388-89  
cycasin and, 378  
fecal cholesterol dehydrogenase and, 376  
 $\beta$ -glucuronidase and, 378-79  
tyrosine and, 382  
Competence  
development of, 212-16, 228  
Complement  
*Entamoeba histolytica* and, 251-52  
host defense in fish and, 483  
Complement activation  
cystic fibrosis/*Pseudomonas aeruginosa* infection and, 36  
immune complex detection and, 30-31  
inflammatory response and, 33  
Concanavalin A  
*Entamoeba histolytica* and, 240  
suppressive IgG binding factor and, 507-8  
Congenital rubella infection, 166  
myelination and, 175  
Conglutinin assay  
immune complexes and, 31  
Congo red  
carcinogenicity of, 380  
Conjugative transposons, 635-55  
genetic studies and, 652-53  
host range of, 652  
*Streptococcus faecalis*  
hemolysin genes and, 651-52  
tetracycline resistance and, 650-51  
Copper  
ferrous iron oxidation and, 315  
*Leptospirillum ferrooxidans* and, 317  
microbial accumulation of, 328  
*Sulfobacillus thermosulfidoxidans* and, 318  
*Sulfolobus* spp. and, 318  
Copper leaching, 320-22  
*Coprinus radiatus*  
tryptophan gene-enzyme relationships in, 57-59  
Coprostanol  
fecal  
diet and, 376  
Coprostanone  
fecal  
diet and, 376  
Coronaviruses  
central nervous system and, 166-67  
Corrinoid proteins  
acetogenic bacteria and, 431-32  
C-reactive protein  
erythema nodosum leprosum and, 45  
host defense in fish and, 483  
lepromatous leprosy and, 43  
Cresol  
colon cancer and, 382  
Creutzfeldt-Jakob disease, 176  
Cryoglobulins  
infective endocarditis and, 40  
lepromatous leprosy and, 43  
*Cryptococcus cereanus*, 23  
*Cryptococcus skinneri*, 17  
*Culex fuscocephala*  
Japanese encephalitis virus and, 398  
*Culex gelidus*  
Japanese encephalitis virus and, 398  
*Culex pipiens*  
Japanese encephalitis virus and, 399, 405-6  
*Culex quinquefasciatus*  
Japanese encephalitis virus and, 399, 405-6  
*Culex tritaeniorhynchus*  
Japanese encephalitis virus and, 398-99, 404-7  
*Culex vishnui*  
Japanese encephalitis virus and, 398, 406  
Cyanide  
microbial silver recovery and, 326  
*Thiobacillus ferrooxidans* and, 315  
Cyanobacteria  
*nif* genes of  
organization of, 537-42  
nitrogen fixation and, 525-43  
Cycasin  
colon cancer and, 378  
Cycasin methylazoxymethanol- $\beta$ -D-glucoside  
carcinogenicity of, 371-72

- Cyclamate  
conversion to cyclohexylamine, 373-74
- Cyclohexylamine  
cyclamate and, 373-74
- Cynicomyces gutturalis, 11-12
- Cysteine  
microaerophiles and, 113
- Cystic fibrosis  
immune complexes in, 34-36
- Pseudomonas aeruginosa* and, 30, 33-39
- Cystitis  
*Escherichia coli* and, 203
- Cytidine  
nucleoside-catabolizing enzymes and, 227
- Cytohalsin B  
malaria parasites and, 455
- Plasmodium knowlesi* and, 458
- Cytochrome a  
*Thiobacillus ferrooxidans* and, 314
- Cytochrome b  
*Clostridium formicoaceticum* and, 419
- Cytochrome c oxidoreductase  
*Thiobacillus ferrooxidans* and, 314
- Cytochrome oxidase  
*Saccharomyces cerevisiae* and, 6
- Cytochromes  
*Azotobacter vinelandii*, 119  
microaerophile, 122
- Cytosol  
Hg(II) reductase in, 609-10  
pH homeostasis in, 266
- Cytotoxins  
*Shigella dysenteriae*, 589-91
- D
- Debaryomyces fluxorum*, 13
- Debaryomyces subglobosus*  
DNA relatedness of, 22
- Decarboxylases  
sodium ion-translocating, 268-69
- Dehydrogenation  
gastrointestinal microflora and, 375
- 7- $\alpha$ -Dehydroxylase  
diet and, 377  
high-fat diet and, 376
- Dehydroxylation  
gastrointestinal microflora and, 374-75
- Demyelination  
coronaviruses and, 166-67  
persistent viral infection and, 176
- RNA viruses and, 160
- Theiler's virus and, 165
- vesicular stomatitis virus and, 169
- Deoxycholic acid  
gastrointestinal microflora and, 375
- Dermacentor andersoni*, 289-95, 300-4  
distribution of, 296
- Dermacentor occidentalis*, 293  
distribution of, 296
- Dermacentor parumapertus*, 293  
distribution of, 296
- Dermacentor* spp.  
distribution of, 294
- Dermacentor variabilis*, 289, 293-95, 299-303  
distribution of, 296
- Dermatonyssus gallinae*  
Japanese encephalitis virus and, 404
- Dermonecrotic toxin  
*Bordetella pertussis*, 667
- Desulfomonas pigra*  
sulfide deposition and, 326
- Desulfotomaculum nigrificans*, 424
- Desulfotomaculum orientis*, 423
- Desulfotomaculum ruminis*, 424
- Desulfotomaculum* spp.  
sulfide deposition and, 326
- Desulfovibrio baarsii*, 423, 424
- acetyl-coenzyme A and, 440
- Desulfovibrio gigas*  
carbon monoxide dehydrogenase of, 433  
hydrogenase of, 426
- Desulfovibrio* spp.  
sulfide deposition and, 326
- Diarrhea  
*Campylobacter jejuni* and, 108, 110  
*Escherichia coli* and, 186  
enterotoxins and, 578
- Dibenzothioephene  
microbial dissolution of, 325
- Dictyostelium discoideum*, 358
- Diet  
fecal mutagens and, 387-88  
gastrointestinal microflora and, 369-71, 375-77
- Diethylstilbestrol  
metabolic fate of, 379
- 3,4-Dihydroxyphenylalanine  
parkinsonism and, 375
- 3,2-Dimethyl-4-aminophenyl  
carcinogenicity of, 388
- Dimethylhydrazine  
carcinogenicity of, 378, 388
- Dimethylnitrosamine  
liver cancer and, 381
- 1,8-Dinitropyrene  
mutagenicity of, 381
- Diphenylamine  
gastrointestinal microflora and, 374
- Dipodascus aggregatus*, 19
- Dipteran larvae  
*Bacillus thuringiensis* and, 568-70
- Distance matrix methods  
ribosomal RNA and, 343-48
- Disulfide oxidoreductases  
mercury resistance and, 609-13
- Dithioerythritol  
*Treponema pallidum* and, 113
- Dithiothreitol  
*Treponema pallidum* and, 113
- DNA  
plasmid  
antibiotic resistance and, 279-81  
*Treponema pallidum*, 124  
visna virus, 174  
yeast, 21-23
- DNA-DNA hybridization  
*Escherichia coli* and, 199  
*Rickettsia rickettsii* and, 289  
yeasts and, 22-23
- DNA hybridization  
enterotoxigenic *Escherichia coli* and, 586-87  
*Vibrio cholerae* and, 579
- DNA polymerase  
ribosomal RNA sequence analysis and, 350
- DNA viruses  
cellular DNA and, 160
- Drosophila persimilis*, 12
- Drosophila pseudoobscura*, 12
- Drosophila* spp.  
desert-adapted, 23  
life cycles of  
yeasts and, 12
- Drought  
*Rhizobium* spp. and, 139
- Drug fever  
cystic fibrosis patient and, 39
- Duffy antigens  
*Plasmodium knowlesi* and, 457-58  
*Plasmodium vivax* and, 458-59
- E
- Edwardsiella ictaluri*  
antigenic structure of, 490  
fish disease and, 480-81  
phagocytosis and, 496
- Edwardsiella tarda*  
phagocytosis and, 496
- Elliptocytosis  
malaria parasites and, 463

- Embsden-Meyerhof-Parnas pathway, 416
- Encephalitis  
measles virus infection and, 171  
See also Japanese encephalitis virus
- Encephalitis lethargica, 395-96
- Encephalomyelitis  
canine distemper virus infection and, 172
- Encephalopathy  
pertussis and, 672, 680
- Endocarditis  
infective, 39-40  
immune complexes in, 40-42
- Endolyases  
*Aspergillus fonsecae* and, 9
- Endomycetales  
tryptophan gene-enzyme relationships in, 61
- Endomycopsis scolyti*  
sexual cycle of, 17
- Endotoxins  
*Bacillus thuringiensis*, 550-51  
*Entamoeba dispar*, 245  
*Entamoeba dysenteriae*, 245  
*Entamoeba histolytica*, 237-55  
cell-mediated immunity and, 252  
collagenase of, 245  
commensal, 245-48  
contact-mediated killing by, 252-55  
humoral antibodies and, 251-52  
pathogenic, 245-48  
virulence of, 248-51  
plasma membrane of, 239-42  
surface-component redistribution in, 243-44  
thiol-proteases of, 244-45
- Enteric bacteria  
tryptophan enzymes of  
genes encoding, 59, 60
- Enteric redmouth disease, 482
- Enterobacter cloacae*  
enterotoxin of, 588
- Enterobacteriaceae  
colicinogenic determinants in, 85  
*Escherichia coli* enterotoxin plasmids and, 586  
gene arrangement in, 87  
genetic organization of, 81
- Enterobacter* spp.  
*Escherichia coli* enterotoxin plasmids and, 586
- Enterobactin  
*Aeromonas hydrophila* and, 496
- Enterococcus faecalis*, 655
- Enterotoxins, 577-95  
*Escherichia coli*, 583-88  
staphylococcal, 591-93
- Enteroviruses  
recurrent meningitis and, 160
- Environment  
*Rhizobium* spp. and, 136-40
- Enzymes  
bacterial  
carcinogenicity of, 377-81  
induction of, 4-5  
pectic, 4  
filamentous fungi and, 7  
pectin-hydrolyzing  
fungi and, 3  
tetrahydrofolate, 430-31  
tryptophan pathway, 56-63  
yeast cell envelope and, 13-16  
See also specific type
- Epiphytic bacteria  
*Rhizobium* spp. and, 141  
*Erwinia herbicola*  
*Medicago sativa* and, 141
- Erythema nodosum leprosum, 44-46
- Erythrocyte-binding proteins  
*Plasmodium falciparum*, 465-66
- Erythrocytes  
cytoskeleton of  
malaria parasites and, 463-64  
invasion by malaria parasites, 452-56  
ligands for malaria parasites, 456-63  
malaria parasites and, 452
- Erythromycin  
gastrointestinal microflora and, 377, 388-89
- Erythromycin resistance  
streptococcal, 636
- Escherichia coli*, 354, 358  
anion exchangers in, 277-78  
*Bacillus thuringiensis* cloning and, 552-54  
biotyping of, 198-99  
chemotaxis and, 143  
clonal analysis of, 185-206  
crystal protein gene of, 566-67  
cytosolic pH homeostasis in, 266  
DNA-DNA hybridization and, 199  
enterotoxins of, 583-88  
extraintestinal disease and, 186  
gene arrangement in, 87, 90  
 $\beta$ -glucuronidase and, 371  
hydrogen peroxide and, 117, 122
- isoenzymes of, 188-93, 200-1  
mercury resistance in, 616-17  
neonatal meningitis and, 201-3  
*nif* genes of, 525  
nucleoside transport in, 227  
outer membrane proteins of, 188-93, 200-1  
plasmid-chromosome interaction in, 93  
potassium ion transport in, 271-74  
properties of, 187-97  
R plasmids of, 655  
serotypes of, 188-93, 198-99  
sodium transport in, 264-66  
tetracycline resistance in, 279  
tryptophan gene-enzyme relationships in, 72-74  
urinary tract infection and, 203-4  
virulence of, 201
- Escherichia coli* K1  
virulence of, 186
- Escherichia coli* K12, 83, 185
- Estriol  
metabolism of, 383
- Estrogens  
intestinal metabolism of, 383
- Ethyl acetate  
cactus-specific yeasts and, 25
- Ethylethylaminetetraacetic acid  
*Escherichia coli* and, 122
- Ethylene oxide  
*Saccharomyces cerevisiae* and, 6  
sterilization of fruit and, 5
- Eubacteria, 340
- Eubacterium lentum*  
gastrointestinal  
diet and, 370
- Eubacterium limosum*, 423  
methanol and, 438
- Eubacterium* spp.  
gastrointestinal, 368
- Euglena gracilis*  
tryptophan pathway enzymes in, 63
- Eukaryotes  
E<sub>1</sub>E<sub>2</sub> ATPases of, 272-73  
phylogeny of, 340-41  
ribosomal RNAs of, 339  
sodium transport in, 264-65  
tryptophan genes of, 55-74  
expression of, 70-74
- Exolyases  
*Clostridium multifementans* and, 9
- Exotoxins  
*Bacillus thuringiensis*, 550-51

## F

- Fecal mutagens, 384-88  
 Fermentation  
   acetogenic bacteria and, 416  
 Ferredoxins  
   *Treponema pallidum* and, 123  
 Ferric sulfate leaching, 312-13  
 Ferrous ions  
   *Gallionella ferruginea* and, 109, 124  
 Ferrous iron  
   oxidation of, 315  
 Ferrous sulfate  
   *Leptospirillum ferrooxidans* and, 317  
 Fibronectin  
   *Plasmodium falciparum* and, 463  
 Filamentous hemagglutinin, 667-68, 676  
 Fish disease, 479-98  
   bacterial, 480-81  
   host in, 482-88  
   immune defense and, 485-88  
   nonimmune defense and, 483-84  
   pathogenesis of, 491-97  
   transmission of, 491  
   viral, 481-82  
 Flaviviruses, 396  
   central nervous system and, 164  
*Flavobacterium* spp.  
   pathogenesis of, 493  
 Flavodoxins  
   microaerophiles and, 123  
 Flavoproteins  
   microaerophiles and, 122  
*Flexibacter columnaris*  
   fish disease and, 480  
*Flexibacter* spp.  
   clinical manifestations of, 482  
   fish disease and, 480  
   pathogenesis of, 493  
 Fluoride  
   *Thiobacillus ferrooxidans* and, 315  
 Food poisoning  
   staphylococcal, 591  
 Formate dehydrogenase  
   acetogenic bacteria and, 417, 426-30  
*Frankia* spp., 112  
 Friend leukemia virus, 173  
 Fruit  
   dehydration of, 5  
   sterilization of, 5  
 Fumarate hydratase  
   *S. volutans* and, 123  
 Fungi  
   legumes and, 141

- metal accumulation by, 328-29  
 pectic enzymes and, 7  
 pectin-hydrolyzing enzymes and, 3  
 tryptophan gene-enzyme relationships in, 57-60  
 Fungicides  
   mercurial, 608  
   *Rhizobium* spp. and, 142-43  
*Fusobacterium* spp.  
   gastrointestinal, 368

## G

- Galactitol  
   pectic enzymes and, 4  
 L-Galactonic acid  
   pectic enzymes and, 4  
 Galactose  
   *Entamoeba histolytica* contact killing and, 254  
   *Plasmodium falciparum* and, 459  
   *Zoogloea* polymer and, 328  
 D-Galactose  
   pectic enzymes and, 4  
 $\beta$ -Galactosidase  
   carcinogenicity of, 377  
   gastrointestinal microflora and, 371  
 $\beta$ -Galactoside  
   arsenic resistance and, 281  
 D-Galacturonic acid  
   pectic enzymes and, 4  
 L-Galacturonic acid  
   pectic enzymes and, 4  
*Gallionella ferruginea*, 109  
   ferrous ions and, 124  
 Galvanic conversion  
   leaching and, 313  
 Gastrointestinal microflora, 367-89  
   antibiotics and, 375-77  
   carcinogenicity of, 377-82  
   colon cancer and, 388-89  
   composition and distribution of, 368-69  
   diet and, 369-71, 375-77  
   fecal mutagens and, 384-88  
   metabolic activities of, 371-75  
   sex steroids and, 382-84  
 Gastrointestinal tract  
   colonization of, 369  
 Genes  
   in situ hybridization of, 360  
   nitrogen fixation, 525-43  
   tryptophan  
     cloned yeast, 59  
     eukaryotic, 70-74  
 Genetic mapping  
   *Pseudomonas* genome and, 95-98  
*Gigaspora* spp.  
   legumes and, 141  
 Glial cells  
   retrovirus infection and, 176  
*Gloeotheca* spp.  
   nitrogen fixation and, 538  
 Glomerulonephritis  
   infective endocarditis and, 41  
   poststreptococcal  
     immune complex tissue damage and, 46  
*Glomus* spp.  
   legumes and, 141  
 Glucanase  
   yeasts and, 14-16  
 D-Glucosamine  
   cactophilic yeasts and, 24  
 Glucose  
   *Zoogloea* polymer and, 328  
 Glucose oxidase  
   malarial parasites and, 118  
 Glucose-6-phosphate dehydrogenase  
   malarial parasites and, 118  
 Glucose-phosphate isomerase  
   *Entamoeba histolytica* and, 245  
 $\beta$ -Glucosidase  
   carcinogenicity of, 377  
   gastrointestinal microflora and, 371  
 $\beta$ -Glucuronidase  
   carcinogenicity of, 377  
   colon cancer and, 378-79  
   diet and, 376-77  
   gastrointestinal microflora and, 371  
 3-Glucuronide  
   estrogen and, 383  
 Glutaconyl CoA decarboxylase  
   bacterial, 269  
 Glutamate  
   *Escherichia coli* enterotoxins and, 584  
 Glutamine synthetase  
   *Rhodopseudomonas capsulata* and, 537  
 Glutathione reductase  
   mercury resistance and, 610  
*Glycine max*  
   *Bradyrhizobium japonicum* inoculant and, 132  
   nodulation-resistant, 147  
 Glycophorin  
   *Plasmodium falciparum* and, 460-61  
   trypsin and, 461  
 Glycophorin-binding proteins  
   *Plasmodium falciparum* and, 465  
 Glycoprotein G  
   piscine rhabdoviruses and, 489



- Glycosidases  
gastrointestinal microflora  
and, 371-72
- Glycosides  
gastrointestinal microflora  
and, 371-72
- Glycosphingolipids  
*Escherichia coli* and, 204
- Gold  
*Thiobacillus ferrooxidans* and,  
315
- Gonococcal infection  
immune complex tissue damage and, 46
- Gram-negative bacteria  
competence development in,  
214-15  
DNA binding in, 216  
fish disease and, 480  
mercury resistance in, 609-26  
tryptophan enzymes of  
genes encoding, 59
- Gram-positive bacteria  
conjugative transposons and,  
652  
DNA binding in, 216  
fish disease and, 480  
gastrointestinal, 368  
mercury resistance in, 626-27  
tryptophan enzymes of  
genes encoding, 59
- H**
- Haemaphysalis japonica*  
Japanese encephalitis virus  
and, 399, 404
- Haemaphysalis leporispalustris*,  
293, 296, 301
- Haemaphysalis* spp.  
distribution of, 294-95
- Haemophilus influenzae*  
competence development in,  
214-16, 228  
DNA binding in, 217-24  
poly- $\beta$ -hydroxybutyrate and,  
215  
natural transformation in,  
212-13, 226
- Haemophilus parainfluenzae*  
competence development in,  
214-15  
DNA binding in, 218  
natural transformation in, 213
- Haemophilus* spp.  
DNA processing in, 227  
nucleoside phosphorylases of,  
227  
plasmid transformation in,  
222-24
- R plasmids of, 655  
transformation competence in,  
230
- Halobacterium halobium*  
chloride pump in, 275-76
- Halorhodopsin  
chloride ion transport and,  
275-76
- Hanseniaspora* spp., 13
- Hansenula anomala*  
cell wall lysis in  
glucanase and, 14-15
- Hansenula capsulata*, 17
- Hansenula holstii*, 11
- Hansenula mrakii*, 13
- Hemagglutinin  
filamentous, 667-68, 676
- Hemolysin  
*Bordetella pertussis*, 679  
*Escherichia coli*, 196
- Hemolysin genes  
*Streptococcus faecalis*, 651-52  
2-Heptyl-4-hydroxyquinoline N-oxide  
sodium ion transport and, 270
- Herbicides  
*Pisum sativum* nodulation  
and, 142  
*Rhizobium phaseoli* and, 141  
*Rhizobium* spp. and, 142-43
- Herpesviruses  
fish disease and, 481-82
- Hexokinase  
*Entamoeba histolytica* and,  
245
- Histamine  
bacterial esterification of, 374
- Histidine transport, 624
- periplasmic binding proteins  
and, 615
- Homeostasis  
pertussis toxin and, 670
- HTLV-III/LAV  
acquired immune deficiency  
syndrome and, 173-75
- Humoral antibodies  
*Entamoeba histolytica* and,  
251-52
- Humoral immunity  
leprosy and, 42
- Hydrocortisone  
amebiasis and, 249
- Hydrogenase  
acetogenic bacteria and, 435-37
- Hydrogen peroxide  
microaerophiles and, 117
- Hydrogen sulfide  
bacterial production of, 608-9
- N-Hydroxyfluorenylacetylamine  
metabolism of, 379
- m-Hydroxyphenylacetic acid  
gastrointestinal microflora  
and, 375
- 7- $\alpha$ -Hydroxysteroid hydroxylase  
carcinogenicity of, 377
- Hyperinsulinemia  
pertussis and, 673, 679
- Hypoglycemia  
pertussis and, 672-73, 679
- I**
- Immune complex disease, 33-46
- Immune complexes  
cystic fibrosis and, 34-36  
detection of, 30-31  
infectious disease and, 29-47  
infective endocarditis and, 40-42  
lepromatous leprosy and, 43-46  
polymorphonuclear leukocytes  
and, 37-38  
properties of, 31-33  
shunt nephritis and, 40-42
- Immune effector cells  
pertussis toxin and, 669, 677
- Immune response  
viral infection and, 164
- Immune serum  
malaria parasites and, 464-65
- Immunity  
See specific type
- Immunodeficiency  
viral infection and, 160
- Immunoglobulin A  
Fc receptors of, 504-7  
synthesis of  
regulation of, 507-12
- Immunoglobulin E  
synthesis of  
regulation of, 512-14
- Immunoglobulin G  
synthesis of  
regulation of, 514-16
- Immunoglobulins  
B cells and, 503-4  
blood-brain barrier and, 163  
erythema nodosum leprosum  
and, 45  
fish disease and, 486-87  
host defense in fish and, 483  
immune complexes and, 31-33  
infective endocarditis and, 40  
lepromatous leprosy and, 43  
malaria parasites and, 464-65  
progressive rubella pan-encephalitis and, 166
- Immunoprophylaxis  
fish disease and, 487-88
- Inclusion bodies  
progressive rubella pan-encephalitis and, 166
- Indole  
carcinogenicity of, 382
- Infection  
See specific type

- Infectious disease  
immune complexes and, 29-47
- Infectious hematopoietic necrosis virus  
antigenic structure of, 488-89  
fish disease and, 481  
immunoglobulins and, 487  
interferon and, 484  
transmission of, 491
- Infectious pancreatic necrosis virus  
antigenic structure of, 489  
fish disease and, 481  
immunoglobulins and, 487  
transmission of, 491  
vaccines and, 487
- Infective endocarditis  
See Endocarditis
- Insertion sequences  
*Pseudomonas aeruginosa*, 85  
*Pseudomonas cepacia*, 95
- In situ hybridization  
ribosomal RNA and, 359-61
- Insulin  
pertussis toxin and, 669
- Interferon  
host defense in fish and, 483  
lymphocytic choriomeningitis virus and, 168  
Sendai virus infection and, 170  
viral infection and, 164
- Interleukin 1  
fish disease and, 485
- Intestinal microflora  
See Gastrointestinal microflora
- Inulin  
fermentation of  
*Kluyveromyces fragilis* and, 9
- Inulinase  
yeast, 9
- Invertebrates  
Japanese encephalitis virus and, 398-99
- Ion transport  
See Bacterial ion transport
- Iron deficiency  
microaerophiles and, 120
- Iron reduction  
microbial, 327
- Iron/sulfur proteins  
microaerophiles and, 122
- Isoenzyme analysis  
*Escherichia coli* and, 186-93, 200-1
- Ixodes brunneus*, 293  
*Ixodes cookei*, 293  
*Ixodes dammini*, 293  
*Ixodes dentatus*, 293  
*Ixodes pacificus*, 293
- Ixodes scapularis*, 293  
*Ixodes* spp.  
distribution of, 294  
*Ixodes texanus*, 293
- J
- Japanese encephalitis virus, 395-408  
clinical significance of, 396-97  
geographic distribution of, 396  
invertebrate hosts of, 398-99  
overwintering and, 401-7  
vertebrate hosts of, 399-401
- Junin virus  
persistent infection and, 168
- K
- Kanamycin resistance  
streptococcal, 636
- Klebsiella aerogenes*  
oxaloacetate decarboxylase and, 268
- Klebsiella pneumoniae*  
enterotoxin of, 588  
fecal  
diet and, 370  
*nif* gene organization in, 526-29
- Klebsiella* spp.  
*Escherichia coli* enterotoxin plasmids and, 586
- Kloeckera* spp., 13
- Kluyveromyces dobzhanskii*, 12-13
- Kluyveromyces drosophilum*, 12-13
- Kluyveromyces fragilis*  
cell wall lysis in  
exo- $\beta$ -glucanases and, 15  
inulin fermentation and, 9  
pectic enzymes and, 7-8
- Kluyveromyces marxianus* var. *lactis*, 71
- Kluyveromyces phaseolusporus*, 12  
glucanases of, 16
- Kluyveromyces* spp.  
DNA-DNA hybridization and, 23
- Kluyveromyces thermotolerans*, 13
- Kluyveromyces veronae*, 13
- Kluyveromyces wickerhamii*, 13
- Kuru, 176
- L
- Lactate dehydrogenase  
*Campylobacter sputorum* and, 124
- Lactobacillus plantarum*  
conjugative transposons and, 652
- Lactobacillus* spp.  
fecal  
diet and, 370  
gastrointestinal, 368, 375-77
- Lactoferrin  
host defense in fish and, 484
- Laminarin  
 $\beta$ -glucanases and, 14-15
- Lasiohelea taiwana*  
Japanese encephalitis virus and, 399
- Lassa virus  
persistent infection and, 167-68
- Leaching  
copper, 320-22  
ecology of, 319-20  
iron-oxidizing microorganisms and, 314-19  
lead, 322  
mechanisms of, 312-13  
metal sulfide, 322  
precious metal, 323-24  
uranium, 320-22
- Lectins  
*Entamoeba histolytica* and, 242-43  
*Rhizobium* attachment and, 144-45
- Legumes  
nodulation of, 131-48
- Lentiviruses  
persistent infection and, 173
- Lepidopteran larvae  
*Bacillus thuringiensis* and, 551-69
- Leprosy, 42-46  
lepromatous, 30  
immune complexes in, 43-46
- Leptospirillum ferrooxidans*  
leaching and, 317-18
- Leuconostoc cremoris*  
conjugative transposons and, 652
- Leukemia  
chronic lymphocytic  
Fc receptors and, 504
- Leukemia viruses  
See specific type
- Leukocytes  
polymorphonuclear  
See Polymorphonuclear leukocytes
- Leukocytosis  
pertussis and, 671, 679
- Lignin  
bacterial degradation of, 441

- Lincomycin  
*Escherichia coli* enterotoxins and, 584
- Lipids  
 acetyl-coenzyme A and, 438
- Lipoamide dehydrogenase  
 mercury resistance and, 610
- Lipophosphopeptidoglycan  
*Entamoeba histolytica* and, 240
- Lipopolysaccharide  
*Bordetella pertussis*, 668  
*Escherichia coli*, 193-96  
 immune complexes and, 35  
*Salmonella* virulence and, 662
- Listeria innocua*  
 conjugative transposons and, 652
- Lithocholic acid  
 gastrointestinal microflora and, 375
- Liver abscess  
*Entamoeba histolytica* and, 249-51
- Liver cancer  
 dimethylnitrosamine and, 381
- Lyme disease  
 immune complex tissue damage and, 46
- Lymphocytes  
 Fc receptors on, 514
- Lymphocytic choriomeningitis virus  
 persistent infection and, 167-68
- Lymphocytosis  
 pertussis and, 669, 673
- Lymphokine macrophage migration inhibition factor  
 fish disease and, 485
- Lymphokines  
 inflammatory response and, 33
- Lysine  
*Escherichia coli* enterotoxins and, 584
- Lysine-ornithine-arginine transport, 624
- Lysogeny  
*Pseudomonas* spp. and, 85
- Lysostatin  
*Bacillus* spp. and, 214
- Lysozyme  
 host defense in fish and, 483
- M**
- Macrophages  
 erythema nodosum leprosum and, 45  
 Fc receptors and, 505  
 host defense in fish and, 484
- immunoglobulin receptors on, 504  
 pertussis toxin and, 669, 674
- Magnetotaxis, 108-9
- Major histocompatibility antigens  
 viral infection and, 161
- Malaria parasites, 111, 451-71  
 adenosine triphosphate and, 464  
 calcium and, 464  
 erythrocyte cytoskeleton and, 463-64  
 erythrocyte ligands for, 456-63  
 merozoite antigens and, 464-70  
 morphology of, 452-56  
 oxygen toxicity and, 118
- Malate dehydrogenase  
*Entamoeba histolytica* and, 245  
*Spirillum volutans* and, 123
- Maltose transport, 624
- periplasmic binding proteins and, 615
- Manganese  
 ferrous iron oxidation and, 315
- Manganese oxide reduction  
 microbial, 327
- Mast cells  
 Fc receptors on, 512
- Maximum likelihood  
 ribosomal RNA and, 344
- Maximum parsimony  
 ribosomal RNA and, 343
- Measles virus  
 subacute sclerosing pan-encephalitis and, 170-72
- Methanosarcina barkeri*  
 phenol degradation and, 441-42
- Methanothermobacter*  
 tungsten and, 429
- Methionine  
*Escherichia coli* enterotoxins and, 584
- Methylazoxymethanol  
 carcinogenicity of, 378
- Methyl cobalamin  
 bacterial production of, 608-9
- Methylmalonyl CoA decarboxylase  
*Veillonella alcalescens* and, 269
- $\alpha$ -Methylmannoside  
*Entamoeba histolytica* and, 240
- Methylobacterium organophilum*  
 natural transformation in, 212
- Methyl orange  
 carcinogenicity of, 380
- Methyltransferase  
 acetogenic bacteria and, 417, 431-32
- Methyl yellow  
 carcinogenicity of, 380
- Metronidazole  
 microaerophiles and, 172-23  
 mutagenicity of, 381
- Microaerophiles  
 aerotactic behavior of, 116-17  
 aerotolerance of  
 stability of, 115  
 aquatic, 108-9  
 culture media and, 113-18  
 growth of, 112-15  
 iron deficiency and, 120  
 nitrogen-fixing, 111-12  
 oxygen sensitivity of, 121-24  
 oxygen toxicity and, 117-25  
 pathogenic, 109-11  
 population density and, 112-13  
 protective enzymes and, 120-21  
 respiratory rates and, 119-20
- Microaerophily, 107-25
- Microbes  
 molecular phylogeny and, 338-42
- Micrococcus radiodurans*  
 natural transformation in, 213
- Microflora  
 See Gastrointestinal microflora
- Micronemes, 453
- Microorganisms  
 metal reclamation and, 311-30
- Midges  
 Japanese encephalitis virus and, 399
- Mitochondria  
 transport system of, 278-79
- Molybdate  
 ferrous iron oxidation and, 315
- Molybdenite  
*Sulfolobus* spp. and, 318
- Molybdenum  
 formate dehydrogenase and, 428  
 microbial recovery of, 327  
*Sulfolobus* spp. and, 318
- Molybdenum leaching, 322
- Monoclonal antibodies  
*Plasmodium falciparum* and, 461  
*Plasmodium knowlesi* surface protein and, 468-69  
 rhotry components and, 469
- Monocytes  
 Fc receptors on, 505, 512-14  
 pertussis toxin and, 669

- Moraxella* spp.  
 natural transformation in,  
 212, 229  
 nucleoside degradation in,  
 228
- Morbilliviruses  
 persistent infection and, 170
- Mosquitoes  
 Japanese encephalitis virus  
 and, 398-99
- Mucic acid  
 pectic enzymes and, 4
- Multiple myeloma  
 circulating lymphocytes and,  
 506
- Mumps virus  
 nerve cell infection and, 162  
 persistent infection and, 170  
 postnatal maturation and, 175-  
 76
- Muramyl dipeptide  
 fish disease and, 485
- Murine hepatitis virus  
 persistent infection and, 166-  
 67
- Murine leukemia virus  
 persistent infection and, 172-  
 73
- Mutagenesis  
 transposon-mediated  
*Bordetella pertussis* and,  
 663  
*Vibrio cholerae*, 581
- Mutagens  
 fecal, 384-88
- Mutations  
 chromosomal  
 enterotoxigenic *Escherichia*  
*coli* and, 587
- Mycobacterium leprae*, 42-43
- Mycobacterium* spp.  
 mercury resistance in, 626-27  
 natural transformation in, 213
- Mycorrhizae  
*Rhizobium* spp. and, 141
- Myelination  
 congenital rubella infection  
 and, 175
- Myxomycetes  
 tryptophan gene-enzyme rela-  
 tionships in, 60-62
- N
- Nadsonia elongata*, 19
- Natural killer cells  
 immunoglobulin receptors on,  
 504  
 pertussis toxin and, 669
- Natural population analysis  
 ribosomal RNA and, 351-59
- Natural transformation, 211-30
- Neisseria gonorrhoeae*  
 DNA binding in, 217-19  
 natural transformation in,  
 213, 226
- Neisseria* spp.  
 natural transformation in, 212  
 nucleoside degradation in,  
 228
- Neomycin  
 quinic acid aromatization and,  
 375  
 salicylazosulfapyridine and,  
 373  
 urinary estriol and, 383
- Neonatal meningitis  
*Escherichia coli* and, 201-3
- Nephritis  
 shunt, 39-40  
 immune complexes in, 40-  
 42
- Nephrosis  
 erythema nodosum leprosum  
 and, 44
- Nerve-cell processes  
 viral infection and, 162
- Neuraminidase  
*Plasmodium falciparum* and,  
 459-61
- Neuroectodermal cells  
 viral infection and, 161
- Neuromuscular junction  
 rabies virus and, 162-63
- Neurons  
 metabolism of  
 viral infection and, 162  
 retrovirus infection and,  
 176
- Neurospora crassa*  
 anthranilate synthase com-  
 plexes in, 71-72  
 nitrate reductase of, 428  
 tryptophan gene-enzyme rela-  
 tionships in, 57-59  
 tryptophan genes of  
 cloning of, 63
- Neurospora* spp.  
 sodium transport in, 264
- Neutrophils  
 pertussis toxin and, 669
- Newborns  
 gastrointestinal colonization  
 in, 369
- Nickel  
 ferrous iron oxidation and,  
 315
- Nicotinamide  
*Escherichia coli* virulence  
 and, 204-5
- Nicotinamide adenine di-  
 nucleotide  
 microaerophiles and, 122
- Nippostrongylus brasiliensis*  
 Fc receptors and, 505
- Nissl bodies  
 viral infection and, 161
- Nitrate  
 nodule formation and, 136  
*Thiobacillus ferrooxidans* and,  
 315
- Nitrate reductase  
*Neurospora crassa*, 428
- 2-Nitrofluorene  
 mutagenicity of, 381
- Nitrogen  
 nodule formation and, 136
- Nitrogenase  
*Rhodospseudomonas capsulata*,  
 537
- Nitrogenase complex  
 nitrogen fixers and, 119
- Nitrogen fixation, 525-43  
*Rhizobium meliloti* and, 133  
*Rhizobium trifolii* and, 133-  
 34
- 1-Nitropyrene  
 carcinogenicity of, 380-81
- Nitroreductase  
 carcinogenicity of, 377-81  
 diet and, 376-77  
 gastrointestinal microflora  
 and, 373
- Nitrosamines  
 carcinogenicity of, 381-82  
 gastrointestinal microflora  
 and, 374
- N-Nitrosation  
 gastrointestinal microflora  
 and, 374
- Nodulation, 131-48  
 host genes and, 147-48  
 initiation of, 144-47
- Novobiocin  
 DNA synthesis and, 225
- Nucleic acids  
 viral  
 in situ hybridization and,  
 360
- Nucleic acid sequencing  
 mixed microbial populations  
 and, 338  
 5S ribosomal RNA and, 353-  
 57
- Nucleoside hydrolases, 228
- Nucleoside phosphorylases,  
 227
- Nucleosides  
 cytidine and, 227
- Nucleotides  
 acetyl-coenzyme A and,  
 438
- Null cells  
 immunoglobulin receptors on,  
 504

## O

- Oligodendrocytes  
  murine hepatitis virus and, 167
- Oligodendroglial cells  
  viral infection and, 161
- Oligodeoxynucleotides  
  in situ hybridization and, 360
- Oligogalacturonides  
  isolation of, 8
- Oligopeptide transport, 624
- Oncogenes  
  retroviruses and, 172
- Oomycetes  
  tryptophan gene-enzyme relationships in, 60-63
- Oral contraceptives  
  antibiotics and, 384
- Ornithodoros turicata*, 300
- Orthomyxoviruses  
  central nervous system and, 164
- Orthovanadate  
  potassium ion transport and, 272
- Otobius lagophilus*, 293
- Ovalocytosis  
  malaria parasites and, 463
- Oxaloacetate decarboxylase  
  *Klebsiella aerogenes* and, 268
- Oxidative phosphorylation  
  adenine nucleotide translocator and, 278-79
- Oxygen toxicity  
  culture media and, 114-15  
  microaerophiles and, 117-25

## P

- Pachycereus schottii*, 24
- Panencephalitis  
  progressive rubella, 166  
  subacute sclerosing, 166, 170  
  measles virus infection and, 171-72
- Parainfluenza virus, 169-70
- Paramecium* spp.  
  isoenzyme electrophoretic mobility in, 247
- Paramyxoviruses  
  central nervous system and, 169-72
- Parasites  
  See specific type
- Parkinsonism  
  gastrointestinal microflora and, 375  
  postencephalitic, 167
- Pectic acid  
  polygalacturonic acid hydrolysis and, 8
- Pectic enzymes, 4  
  filamentous fungi and, 7
- Pectin esterase  
  synthesis of, 4-5
- Pectins  
  endolyase specific for, 9-10  
  enzymatic breakdown of, 4  
  enzymatic hydrolysis of, 3  
  pectic enzymes and, 4
- Pelobacter acidigallici*  
  phenol degradation and, 441
- Penicillin  
  urinary estriol and, 383
- Penicillin G  
  *Bacillus* spp. and, 214  
  *Penicillium chrysogenum*  
    pectic enzymes of, 4  
    radium accumulation by, 328
- Pentagalacturonic acid  
  polygalacturonic acid hydrolysis and, 8
- Peptococcus aerogenes*  
  glutaconyl CoA decarboxylase of, 269
- Peptococcus* spp.  
  gastrointestinal, 368  
  diet and, 370
- Peptostreptococcus productus*, 423
- Peptostreptococcus* spp.  
  gastrointestinal, 368
- Peripheral edema  
  Rocky Mountain spotted fever and, 288
- Peroxidases  
  microaerophiles and, 114, 121
- Pertussis, 662  
  clinical manifestations of, 671-72  
  pathophysiology of, 675-81
- Pertussis toxin, 669-70
- Pesticides  
  *Rhizobium* spp. and, 142-43
- Pestivirus  
  border disease in sheep and, 166
- pH  
  *Rhizobium* spp. and, 138
- Phaffia rhodozyma*, 19
- Phage typing  
  *Rhizobium* populations and, 133
- Phagocytes  
  host defense in fish and, 484
- Phagocytosis  
  *Entamoeba histolytica* and, 242-43  
  fish disease and, 496  
  immune complex disease and, 37  
  immune complexes and, 33  
  pertussis toxin and, 677
- Phaseolus vulgaris*  
  *Rhizobium phaseoli* and, 141, 144
- Phenol  
  bacterial degradation of, 441-42  
  colon cancer and, 382
- Phenylmethylethers  
  acetogenic bacteria and, 422-23
- Pheromone cAM373, 645
- Phosphates  
  *Rhizobium* spp. and, 136-37
- Phosphate-sugar phosphate exchange  
  bacterial, 276-78
- Phosphatidylinositol  
  *Entamoeba histolytica* and, 254
- pertussis toxin and, 669
- Phosphoenol pyruvate  
  *Thiobacillus ferrooxidans* and, 314
- Phosphoglucosylase  
  *Entamoeba histolytica* and, 245
- Photobacterium phosphoreum*, 355
- Photosynthetic bacteria  
  nitrogen fixation and, 525-43
- Phylogenetic trees, 342-48  
  alternatives to, 348  
  distance matrix method and, 344-48
- Phylogeny  
  microbes and, 338-42  
  ribosomal RNA and, 338-41
- Pichia amethionina*, 25
- Pichia cactophila*, 24-25
- Pichia carsonii*, 13
- Pichia deserticola*, 25
- Pichia fluxuum*, 12-13
- Pichia haplophila*, 10
- Pichia heidi*, 24
- Pichia membranaefaciens*, 13, 23-24
- Pichia pastoris*, 12, 17, 19
- Pichia pseudocactophila*, 24-25
- Pichia quercuum*, 13
- Pichia salicaria*, 18
- Pichia scolyti*, 17
- Pichia silvestris*, 13
- Pichia trehalophila*, 18
- Pichia vini*, 13
- Picornaviruses  
  central nervous system and, 165-66
- Pinocytosis  
  *Entamoeba histolytica* and, 239-40
- Pinus* spp.  
  bark beetle yeasts and, 10-11  
  *Hansenula capsulata* and, 17

- Pisum sativum*  
nodulation of  
herbicides and, 142
- Plasma cells  
immunoglobulin secretion  
and, 512
- Plasmacytoma  
circulating lymphocytes and,  
506
- Plasmapheresis  
immune complexes and, 39
- Plasmid DNA  
antibiotic resistance and, 279-  
81
- Plasmids  
*Bacillus thuringiensis*, 551-52  
*Escherichia coli*, 197  
natural transformation in,  
221-24  
*Pseudomonas aeruginosa*, 85-  
86  
*Pseudomonas*, 81, 93-95  
*Rhizobium*, 135, 146-47  
*Plasmodium berghei*  
superoxide dismutase and,  
121  
*Plasmodium chabaudi*  
250-kd glycoprotein of, 467-  
68  
*Plasmodium falciparum*, 111  
antibodies and, 461  
erythrocyte-binding proteins  
of, 465-66  
erythrocyte ligands for, 457-  
63  
glycophorin and, 460-61  
glycophorin-binding proteins  
of, 465  
195-kd glycoprotein of, 467-  
68  
immune serum and, 464  
invasion inhibitors and, 462-  
63  
merozoite proteins of, 469-70  
monoclonal antibodies and,  
469  
ovalocytosis and, 463  
oxygen toxicity and, 118  
155-kd protein of, 466  
S antigens of, 466-67  
sialic acid and, 459-60  
trypsin and, 461  
*Plasmodium knowlesi*  
Duffy antigens and, 457-58  
erythrocyte band 3 and, 459  
erythrocyte ligands for, 457-  
59  
230-kd glycoprotein of, 467-  
68  
immune serum and, 464  
ovalocytosis and, 463  
66-kd surface protein of, 467-  
140-kd surface protein of,  
468-69  
*Plasmodium lophurae*, 456  
*Plasmodium malariae*  
ovalocytosis and, 463  
*Plasmodium vivax*  
blacks and, 458-59  
Duffy antigens and, 458-59  
erythrocyte ligands for, 457-  
59  
ovalocytosis and, 463  
*Plasmodium yoelii*  
230-kd glycoprotein of, 467-  
68  
monoclonal antibodies and,  
469  
*Plectonema* spp.  
*nif* genes of, 538  
Poliovirus  
chromatolysis and, 161  
Poliomyelitis virus  
human type 2  
persistent infection and,  
165  
Polygalacturonase  
synthesis of, 4-5  
yeast, 7-10  
Polygalacturonic acid  
exolyase specific for, 9  
hydrolysis of, 8  
*Phytophthora fragilis* and,  
7  
pectic enzymes and, 4  
Poly- $\beta$ -hydroxybutyrate  
competence induction and,  
215  
Polylactosamine  
*Plasmodium falciparum* and,  
463  
Polymorphonuclear leukocytes  
erythema nodosum leprosum  
and, 45  
Fc receptors on, 512-14  
immune complexes and, 37-  
38  
immunoglobulin receptors on,  
504  
Ponceau 3R  
carcinogenicity of, 380  
Porin channels  
*Campylobacter jejuni* and,  
121-22  
Potassium ion transport  
bacterial, 271-75  
Precious metal leaching, 323-24  
Prematurity  
infant gastrointestinal col-  
onization and, 369  
Progesterone  
metabolism of, 384  
Progressive rubella pan-  
encephalitis, 166
- Prokaryotes  
E<sub>1</sub>E<sub>2</sub> ATPases in, 272-73  
natural competence in, 212-16  
phylogeny of, 340-41  
tryptophan gene-enzyme re-  
lationships in, 58-60
- Pronase  
*Plasmodium knowlesi* merozo-  
ites and, 457
- 2-Propanol  
cactus-specific yeasts and, 25
- Propylene oxide  
sterilization of fruit and, 5
- Proteases  
*Aeromonas salmonicida*, 497  
Proton-motive force  
bacterial ion transport and,  
265, 271  
*Prototheca moriformis*, 17  
Protozoa  
*Rhizobium* spp. and, 141  
Pseudomonads  
pathogenicity of, 79  
*Pseudomonas acidovorans*  
gene arrangement in, 87  
*Pseudomonas aeruginosa*  
aliphatic amidases of, 80  
chromosome of, 81, 85  
map of, 98  
rearrangement of, 97  
transposon in, 85  
cystic fibrosis and, 30, 33-  
39  
enterotoxin of, 589  
FP plasmids of, 85-86  
gene arrangement in, 86-87,  
92  
lysogeny in, 85  
plasmid-chromosome interac-  
tion in, 94  
polymorphonuclear leukocytes  
and, 37  
*Pseudomonas aeruginosa* PAO  
chromosome of  
genetic circularity of, 81  
map of, 83, 88-89  
genetic map of, 91, 95-98  
plasmid FP39 and, 84  
*Pseudomonas aeruginosa* PAT  
chromosome of  
genetic circularity of, 81  
*Pseudomonas alcaligenes*  
natural transformation in, 229  
*Pseudomonas carboxydovorans*  
carbon monoxide de-  
hydrogenase of, 432  
*Pseudomonas cepacia*  
insertion sequences in, 95  
*Pseudomonas fluorescens*, 355  
*Pseudomonas* genome, 79-100  
gene arrangement in, 86-93  
genetic maps of, 95-98

- plasmid-chromosome interaction in, 93-95  
 plasmids in, 93  
*Pseudomonas maltophilia*  
 silver recovery and, 326  
*Pseudomonas mendocina*  
 natural transformation in, 229  
*Pseudomonas morsprunorum*  
 prophages in, 85  
*Pseudomonas pseudoalcaligenes*  
 natural transformation in, 229  
 poly- $\beta$ -hydroxybutyrate and, 215  
*Pseudomonas putida*  
 chromosome of, 81  
 map of, 98  
 rearrangement in, 86-87, 92, 97  
 plasmid-chromosome interaction in, 94  
*Pseudomonas putida* PPN  
 chromosome of  
 genetic circularity of, 81  
 genetic map of, 83, 90-92, 95-98  
*Pseudomonas* spp.  
 genetic analysis of, 81-84  
 iron reduction and, 327  
 mercury resistance in, 616-17, 622  
 natural transformation in, 212  
 nucleoside hydrolases of, 228  
 plasmids of, 81  
 taxonomic and genomic data for, 80  
*Pseudomonas stutzeri*  
 competence development in, 215  
 natural transformation in, 226, 229  
 plasmid transformation in, 223  
*Pseudomonas syringae*  
 chromosome of  
 map of, 91, 98  
 rearrangement in, 87, 97  
 pv. *phaseolicola* strain I.R.719  
 plasmid-chromosome interaction in, 95  
*Pseudomonas testosteroni*, 354  
*Psophocarpus tetragonolobus*  
 nodulation of, 132-33  
 Pulmonary edema  
 Rocky Mountain spotted fever and, 288  
 Pulmonary osteoarthropathy  
 cystic fibrosis and, 36  
 Purple bacteria  
 oligonucleotide catalog comparisons of, 354-56  
 Pustulan  
 $\beta$ -glucanases and, 14-15  
 Pyelonephritis  
*Escherichia coli* and, 203  
 Pyocins  
*Pseudomonas aeruginosa*, 85  
 Pyrite  
 microbial dissolution of, 325  
*Pyrodictium* spp., 354  
 Pyruvate  
*Zoogloea* polymer and, 328  
 Pyruvate:ferredoxin oxidoreductases  
 microaerophiles and, 123  
 Q  
 Quercetin  
 carcinogenicity of, 378  
 Quinic acid  
 aromatization of, 375  
 R  
 Rabies virus, 169, 488  
 acetylcholine receptors and, 162-63  
 Radium  
 fungal accumulation of, 328-29  
 Raji cell assay  
 immune complexes and, 31  
 Recombinant DNA  
 mixed microbial populations and, 338  
 Reductases  
 gastrointestinal microflora and, 372-73  
 Renal disease  
 erythema nodosum leprosum and, 44  
 infective endocarditis and, 41  
 Renal infarction  
 infective endocarditis and, 41  
*Renibacterium salmoninarum*  
 antigenic structure of, 490-91  
 cell-mediated immunity and, 485  
 clinical manifestations of, 482  
 fish disease and, 480-81  
 pathogenesis of, 494  
 transmission of, 491  
 Reoviruses  
 central nervous system and, 164  
 Reticulocytes  
*Plasmodium vivax* and, 458-59  
 Retroviridae  
 reverse transcriptase and, 160  
 Retroviruses  
 central nervous system and, 172-75  
 Reverse transcriptase  
 ribosomal RNA sequence analysis and, 350  
 RNA viruses and, 160  
 Rhabdoviruses  
 central nervous system and, 169  
 fish disease and, 481-82  
 piscine  
 antigenic structure of, 488-89  
 pathogenesis of, 492  
 Rheumatic fever  
 immune complex tissue damage and, 46  
 Rheumatoid factors  
 cystic fibrosis and, 34  
 immune complexes and, 31  
 infective endocarditis and, 40  
 lepromatous leprosy and, 43  
*Rhipicephalus sanguineus*, 291-93  
 distribution of, 294  
*Rhipicephalus* spp.  
 distribution of, 294  
*Rhizobium fredii*  
 plasmids of, 147  
*Rhizobium* inoculants  
 establishment in field, 132-33  
*Rhizobium leguminosarum*  
 bacteriocins in, 141  
 chemotaxis and, 143  
 drought and, 139  
 pH and, 138  
 plasmids of, 135, 147  
 population genetics of, 134  
*Rhizobium lupini*  
 chemotaxis and, 143  
*Rhizobium meliloti*  
 chemotaxis and, 143  
 genetic exchange among, 135  
 nitrogen fixation and, 133  
 pH and, 138  
 plasmid transfer in, 135  
 population genetics of, 134  
 salt-tolerant, 140  
*Rhizobium phaseoli*  
 herbicides and, 141  
 pH and, 138  
*Phaseolus vulgaris* and, 144  
 population genetics of, 134  
*Rhizobium* population  
 characterization of, 133-35  
*Rhizobium* spp., 111-12  
 bacteriocins and, 141-42  
 bacteriophages and, 140  
*Bdellovibrio* spp. and, 140  
 biological factors and, 140-42  
 drought and, 139  
 environmental factors and, 136-40  
 epiphytic bacteria and, 141

- genetic exchange among, 134-36
- herbicides and, 142-43
- motility of, 143
- mycorrhiza and, 141
- nif* genes of, 526-28
- nodule initiation in, 146-47
- pesticides and, 142-43
- plasmids of, 146-47
- protozoa and, 141
- salinity and, 139-40
- temperature and, 138-39
- Rhizobium trifolii*
- bacteriocins in, 141-42
- bacteriophages and, 140
- host-specificity genes in, 145
- nitrogen fixation and, 133-34
- phosphates and, 137
- root attachment of, 145
- temperature and, 138-39
- Rhizopus arrhizus*
- metal accumulation by, 328
- Rhizosphere
- competition in, 143-47
- Rhodopseudomonas capsulata*
- nif* gene organization in, 529-37
- Rhodopseudomonas* spp.
- iron reduction and, 327
- Rhodospirillum rubrum*
- Fe-protein of, 537
- Rhospriates, 453, 469
- Ribosomal RNA
- cluster analysis and, 342-43
- distance matrix methods and, 343-48
- in situ hybridization and, 359-61
- maximum likelihood and, 344
- maximum parsimony and, 343
- microbial populations and, 341-42
- natural population analysis
- and, 351-59
- phylogeny and, 338-41
- sequence data bases and, 348-51
- Ribulose-bisphosphate carboxylase
- acetogenic bacteria and, 417
- Sulfobacillus thermosulfidooxidans* and, 318
- Rickettsia australis*, 288
- Rickettsia bellii*, 289, 301-2
- Rickettsia conorii*, 288
- Rickettsiae*
- adenine nucleotide translocator in, 278-79
- Rickettsia montana*, 289, 301-4
- Rickettsia prowazekii*
- adenine nucleotide translocator in, 278-79
- Rickettsia rhipicephali*, 289, 301-2
- Rickettsia rickettsii*, 287-305
- infectivity and pathogenicity of, 297-302
- life cycle of, 290-94
- prevalence and distribution of, 294-97
- transmission of, 302-5
- Rickettsia sibirica*, 288, 294-95
- Rifampicin resistance
- Rhodopseudomonas capsulata* and, 534
- Rifampin
- oral contraceptives and, 384
- resistance
- Pseudomonas aeruginosa*, 85
- Riftia pachyptila*, 351-52
- Riftia* spp., 355
- Rinderpest virus
- persistent infection and, 170
- RNA
- See specific type
- RNA polymerase
- Bacillus thuringiensis*, 567
- RNA-RNA hybridization
- piscine rhabdoviruses and, 488
- RNA viruses, 159-79
- persistent
- central nervous system and, 164-75
- mechanisms for, 164
- Rocky Mountain spotted fever, 287-88
- See also *Rickettsia rickettsii*
- rRNA
- See Ribosomal RNA
- Rubella virus
- persistent infection and, 166
- Rubidium
- Thiobacillus ferrooxidans* and, 315
- Rusticyanin
- Thiobacillus ferrooxidans* and, 314
- Rutin
- conversion to quercetin, 378
- S
- Saccharomyces cerevisiae*
- arginine pathway of
- metabolic elasticity of, 73-74
- B. circulans* and, 14
- nonrespiratory mutants of, 6
- tryptophan gene-enzyme relationships in, 57-59
- tryptophan genes of
- cloning of, 63
- tryptophan pathway of
- metabolic elasticity of, 73-74
- Saccharomyces dobzhanskii*, 12
- Saccharomyces drosophilae*, 12
- Saccharomyces kluyveri*, 13
- Saccharomyces pastori*, 12
- Saccharomyces phaseolusporus*, 12
- Saccharomyces* spp.
- DNA relatedness of, 22
- Saccharomyces telluris*, 22
- Saccharomycopsis guttulata*, 11
- Salicylazosulfapyridine
- ulcerative colitis and, 373
- Salinity
- Rhizobium* spp. and, 139-40
- Salmonella* infection
- immune complex tissue damage and, 46
- Salmonella* spp.
- enterotoxins of, 588-89
- nif* genes of, 527
- virulence factor for, 662
- Salmonella typhimurium*
- aerotactic behavior of, 116
- enterotoxin of, 589
- FIRN clone of, 197-98
- gene arrangement in, 87, 90
- O groups in, 198
- Schizosaccharomyces pombe
- tryptophan gene-enzyme relationships in, 57-61
- Schizosaccharomyces spp.
- cell wall lysis in
- glucanase and, 14
- Schizosaccharomyces versatilis*
- exo- $\beta$ -glucanase of, 15
- Schwanniomyces occidentalis*
- DNA of, 71
- Sclerocystis* spp.
- legumes and, 141
- Scrapie, 176
- Selenium
- ferrous iron oxidation and, 315
- formate dehydrogenase and, 429
- microbial recovery of, 327
- Sendai virus, 169-70
- postnatal maturation and, 175-76
- Serotyping
- Rhizobium* populations and, 133
- Serum sickness
- cystic fibrosis and, 36, 39
- Sex steroids
- gastrointestinal microflora and, 382-84



- Shigella dysenteriae*  
toxins of, 589-91  
*Shigella flexneri*  
enterotoxin of, 588  
Sialic acid  
  *Plasmodium falciparum* and,  
  459-60, 462  
Silver  
  leaching, 323-24  
  microbial recovery of, 326  
  *Thiobacillus ferrooxidans* and,  
  315-16  
Sodium ion transport  
  bacterial, 264-71  
Soil type  
  *Rhizobium* spp. and, 136-38  
  *Solemya velum* Say, 351-52  
Spectinomycin resistance  
  *Pseudomonas aeruginosa*, 85  
Spectrin  
  malaria parasites and, 464  
*Spirillum volutans*, 108  
  aerotactic behavior of, 116  
  aerotolerance of, 115  
  catalase and, 120  
  growth of, 113  
  hydrogen peroxide and, 117  
  iron deficiency and, 120  
  metronidazole and, 122  
  NADH and, 122  
  respiratory rate for, 119  
  tricarboxylic acid cycle en-  
  zymes of, 123  
*Sporobolomyces singularis*, 17  
*Sporomusa acidovorans*, 418  
*Sporomusa sphaeroides*, 418  
*Sporopachydermia* spp., 24  
Spring viremia of carp virus  
  antigenic structure of, 488  
  fish disease and, 481-82  
  interferon and, 484  
  pathogenesis of, 491-92  
*Staphylococcus aureus*  
  *Bacillus thuringiensis* pro-  
  toplasts and, 552  
  cadmium resistance in, 280  
  conjugative transposons and,  
  652  
  enterotoxins of, 591-93  
  infective endocarditis and, 40  
  mercury resistance in, 626  
  pheromone cAM373 and, 645  
  silver recovery and, 326  
*Staphylococcus epidermidis*  
  cerebrospinal fluid shunts  
  and, 40  
*Staphylococcus* spp.  
  gastrointestinal, 368  
Stem cells  
  pertussis toxin and, 669  
7- $\alpha$ -Steroid dehydrogenase  
  carcinogenicity of, 377  
Steroids  
  cystic fibrosis and, 39  
  dehydrogenation of  
  gastrointestinal microflora  
  and, 375  
Stickland reaction, 374  
Stomach acid  
  cholera toxin and, 578  
Streptococci  
  antibiotic resistance in, 635-  
  55  
  competence in, 213  
  gastrointestinal, 368  
   $\alpha$ -hemolytic  
  infective endocarditis and,  
  40  
  mercury resistance in, 626  
  nucleoside phosphorylases in,  
  227  
  plasmid transformation in,  
  222-23  
  tetracycline resistance in, 650-  
  51  
*Streptococcus agalactiae*  
  conjugative transposons and,  
  652  
  drug resistance in, 636, 648-  
  49  
  tetracycline resistance in, 650  
*Streptococcus cremoris*  
  conjugative transposons and,  
  652  
*Streptococcus faecalis*  
  conjugative transposons and,  
  652  
  diphenylamine and, 374  
  drug resistance in, 636, 649-  
  50  
  gastrointestinal  
  diet and, 370  
   $\beta$ -glucuronidase and, 371  
  hemolysin genes of, 651-52  
  infective endocarditis and,  
  40  
  potassium transport systems  
  in, 273-74  
  protoplast transformation sys-  
  tem in, 642  
  sex pheromone production in,  
  653  
  sodium transport in, 265-67  
  tetracycline resistance in, 650  
*Streptococcus faecium*  
  fecal bile acids and, 376  
*Streptococcus lactis*  
  conjugative transposons and,  
  652  
  phosphate-sugar phosphate ex-  
  changer in, 276-78  
*Streptococcus mutans*  
  conjugative transposons and,  
  652  
*Streptococcus pneumoniae*  
  competence in, 215-16  
  conjugative transposons and,  
  652  
  DNA binding in, 216-20  
  DNA processing in, 227  
  drug resistance in, 646-48  
  natural transformation in,  
  212-13  
  tetracycline resistance in, 650  
*Streptococcus pyogenes*  
  conjugative transposons and,  
  652  
  drug resistance in, 636, 649  
  streptolysin S production in,  
  653  
*Streptococcus sanguis*  
  conjugative transposons and,  
  652  
  DNA binding in, 217-18  
  DNA uptake in, 225  
  drug resistance in, 649  
  lysis of  
  competence factors and,  
  214  
  natural transformation in,  
  212-13  
  pheromone cAM373 and, 645  
  RNA/DNA synthesis in, 214  
  transformation in, 637, 642  
*Streptomyces* spp.  
  mercury resistance in, 626  
  natural transformation in, 212  
Streptomycin resistance  
  *Pseudomonas aeruginosa*, 85  
  streptococcal, 636  
Sucrose  
  fermentation of, 6  
Sulfamethoxypyridazine  
  oral contraceptives and, 384  
Sulfanilamide resistance  
  *Pseudomonas aeruginosa*, 85  
O-Sulfates  
  gastrointestinal microflora  
  and, 373  
Sulfide  
  *Beggiatoa* spp. and, 124-25  
Sulfite oxidase  
  *Thiobacillus ferrooxidans* and,  
  314  
*Sulfobacillus thermosulfidoox-*  
  *idans*  
  leaching and, 318  
*Sulfolobus acidocaldarius*  
  coal desulfurization and, 325  
*Sulfolobus brierleyi*  
  coal desulfurization and, 325  
*Sulfolobus solfataricus*, 358  
*Sulfolobus* spp.  
  anaerobic growth of, 354  
  leaching and, 318-19  
  molybdenum, 322

## 704 SUBJECT INDEX

- Sulfonamides  
gastrointestinal microflora and, 374
- C-Sulfonates  
gastrointestinal microflora and, 373
- N-Sulfonates  
gastrointestinal microflora and, 373
- Sulfur dioxide  
coal combustion and, 324
- Superoxide dismutase  
microaerophiles and, 114, 120-21
- Synechococcus* spp.  
natural transformation in, 212
- Syntrophomonas wolfei*, 442
- Syphilis*, 108-10, 122
- T
- Tacaribe virus  
persistent infection and, 168-69
- Tamiami virus  
persistent infection and, 168
- Tellurium  
ferrous iron oxidation and, 315
- Temperature  
*Rhizobium* spp. and, 138-39
- Tetracycline  
*Escherichia coli* enterotoxins and, 584  
gastrointestinal microflora and, 377, 388-89  
resistance  
in *Escherichia coli*, 279  
in *Streptococcus* spp., 650-51
- Tetragalacturonic acid  
polygalacturonic acid hydrolisis and, 8
- Tetrahydrofolate enzymes  
acetogenic bacteria and, 430-31
- Tetrahymena* spp.  
isoenzyme electrophoretic mobility in, 247
- Thallium  
*Thiobacillus ferrooxidans* and, 315  
uptake in *Chromatium vinosum*, 274-75
- Theiler's virus  
persistent infection and, 165
- Thermus aquaticus*, 354
- Thermus thermophilus*, 354
- Thiobacillus ferrooxidans*, 314-17, 354-55  
coal desulfurization and, 324-25  
copper leaching and, 320-21  
environment and, 319-20  
ferric sulfate leaching and, 312-13  
galvanic conversion and, 313  
metal sulfide leaching and, 322  
precious metal leaching and, 323-24  
silver recovery and, 326  
uranium leaching and, 321-22
- Thiobacillus* spp., 353  
iron reduction and, 327
- Thiobacillus thiooxidans*, 354  
coal desulfurization and, 324  
manganese dioxide and, 327  
silver recovery and, 326
- Thioglycolate  
microaerophiles and, 113
- Thiol-proteases  
*Entamoeba histolytica*, 244-45
- Thiomicrospira pelophila*, 356
- Thiomicrospira* strain L-12, 356-57
- Thioredoxin reductase  
mercury resistance and, 610
- Thiosulfate  
microbial silver recovery and, 326
- Thiourea  
microaerophiles and, 113
- Thorium  
fungal accumulation of, 328
- Ticks  
Japanese encephalitis virus and, 399, 404  
*Rickettsia rickettsii* and, 287-305
- Tick typhus, 288
- T-lymphocytes  
fish disease and, 485  
immunoglobulin receptors on, 504  
lymphocytic choriomeningitis virus and, 168  
polar tuberculoïd leprosy and, 42
- Pseudomonas aeruginosa* proteases and, 35
- Theiler's virus and, 165
- viral infection and, 164
- Togaviruses  
central nervous system and, 166
- Torpedo californica*  
ATPases of, 273
- Torulopsis nitratophila*, 10
- Torulopsis piniolopesei*, 22
- Torulopsis sonorensis*, 23
- Torulopsis* spp., 19
- Torulopsis stellata*, 13
- Toxins  
See specific type
- Tracheal cytotoxin, 670  
host defenses and, 678  
toxicity of, 678
- Transconjugation  
*Bacillus thuringiensis* and, 552
- Transferrin  
host defense in fish and, 483-84
- Transformation  
natural, 211-30
- Transposons  
conjugative, 635-55  
genetic studies and, 652-53  
host range of, 652  
*Streptococcus faecalis*  
hemolysin genes and, 651-52  
tetracycline resistance and, 650-51
- Pseudomonas aeruginosa*, 85
- Treponema pallidum*, 108  
ferrodoxin and, 123  
hydrogen peroxide and, 117  
metronidazole and, 122  
microaerobic survival of, 113  
oxygen sensitivity of, 124  
protective enzymes and, 120-21
- Treponema pallidum* subsp. *pallidum*, 110
- Treponema pallidum* subsp. *penetens*, 110
- Treponema phagedenis*  
pyruvate:ferrodoxin oxidoreductase of, 123
- Tricarboxylic acid cycle  
microaerophiles and, 123-24
- Trichosporon aculeatum*, 13
- Trichosporon diddensii*, 10
- Trichosporon penicillatum*, 17
- Trifolium pratense*  
nodulation-resistant, 147
- Trifolium repens*  
nodulation-resistant, 147
- Trifolium subterraneum*  
*Rhizobium trifolii* and, 133
- Trigalacturonic acid  
polygalacturonic acid hydrolisis and, 8
- Triphosphoinositol  
*Entamoeba histolytica* and, 254
- Trypan blue  
carcinogenicity of, 380
- Trypsin  
*Plasmodium falciparum* and, 461  
*Plasmodium knowlesi* surface protein and, 468

- Tryptophan  
   biosynthesis of  
     anthranilate synthase and, 56  
   carcinogenicity of, 382  
 Tryptophan genes  
   cloned yeast  
     expression of, 69  
   eukaryotic, 55-74  
     expression of, 70-74  
 Tryptophan pathway  
   activity domains of, 63-69  
   enzymes of, 56-63  
   *Saccharomyces cerevisiae*  
     metabolic elasticity of, 73-74  
 Tryptophan synthase  
   prokaryotic, 58  
*Tsuga heterophylla*  
   yeasts and, 17  
 Tuberculosis  
   immune complex tissue damage and, 46  
   pertussis and, 676  
 Tungsten  
   formate dehydrogenase and, 428-29  
 Typhus  
   tick, 288  
 Tyrosine  
   carcinogenicity of, 382  
 U  
 Ulcerative colitis  
   salicylazosulfapyridine and, 373  
 Uranium  
   ferrous iron oxidation and, 315  
   fungal accumulation of, 328  
   leaching of, 320-22  
   microbial accumulation of, 328  
   microbial recovery of, 327  
   *Thiobacillus ferrooxidans* and, 316  
 Urea  
   intestinal ammonia and, 374  
 Urinary tract infection  
   *Escherichia coli* and, 188, 203-4  
 Urticaria  
   cystic fibrosis patient and, 39  
 V  
 Vaccination  
   *Pseudomonas aeruginosa*  
     cystic fibrosis and, 38  
     fish disease and, 487-89  
   Valinomycin  
     ATPase and, 274  
   Vasculitis  
     cutaneous  
       cystic fibrosis and, 36  
       erythema nodosum leprosum and, 45  
   *Veillonella alcalescens*  
     methylmalonyl CoA decarboxylase of, 269  
   Vesicular-arbuscular-mycorrhizal associations, 141  
   Vesicular stomatitis virus, 169, 488  
   *Vibrio alginolyticus*  
     sodium ion pump of, 269-70  
   *Vibrio anguillarum*  
     antibodies and, 487  
     antigenic structure of, 490  
     fish disease and, 480, 484  
     iron-sequestering system in, 497  
     pathogenesis of, 492-95  
     vaccines and, 487-88  
   *Vibrio cholerae*  
     *Escherichia coli* enterotoxin  
       plasmids and, 586  
     toxin of, 578-83  
   *Vibrio costicola*  
     sodium ion pump of, 271  
   *Vibrio harveyi*, 355  
     *toxR* sequences of, 582-83  
   *Vibrio ordalii*  
     antigenic structure of, 490  
     fish disease and, 480  
     macrophages and, 484  
     pathogenesis of, 493-95  
   *Vibrio parahemolyticus*  
     sodium ion pump of, 271  
     *toxR* sequences of, 582-83  
   Viral hemorrhagic septicemia virus  
     antigenic structure of, 488  
     fish disease and, 481  
     immunoglobulins and, 487  
     interferon and, 484  
     pathogenesis of, 491-92  
     vaccines and, 488  
   Viral infections  
     central nervous system and, 161-63  
   Viruses  
     fish disease and, 481-82  
     See also specific type  
   Visna virus disease, 173-74  
   Vomiting  
     enterotoxins and, 578  
 W  
 Whooping cough, 662  
   clinical manifestations of, 671-72  
 X  
 Xanthine oxidase  
   malarial parasites and, 118  
*Xanthobacter autotrophicus*, 112  
*Xanthobacter flavus*, 112  
 Y  
 Yeasts  
   bark beetle, 10-11, 17  
   cactus necroses and, 23-25  
   carotenoid-containing, 19  
   cell envelopes of  
     enzymes and, 13-16  
   coexistence with bacteria, 2  
   DNA-DNA hybridization in, 22-23  
   DNA relatedness of, 22  
   *Drosophila* life cycles and, 12  
   glucanases and, 14-16  
   inulinase and, 9  
   marine, 10  
   nuclear DNA of  
     base composition of, 21-23  
   polygalacturonase and, 7-10  
   sodium transport in, 264  
   transglycosylation in, 18  
   tryptophan genes of  
     expression of, 69  
*Yersinia enterocolitica*  
   enterotoxin of, 588  
*Yersinia ruckeri*  
   antigenic structure of, 490  
   clinical manifestations of, 482  
   fish disease and, 480-81  
   pathogenesis of, 494  
   vaccines and, 487  
 Z  
 Zinc  
   ferrous iron oxidation and, 315  
*Zoogloea ramigera*  
   metal accumulation by, 328  
 Zygomycetes  
   tryptophan gene-enzyme relationships in, 60-62  
 Zymodemes  
   *Entamoeba histolytica* and, 245-48